Clostridium difficile infection outbreak in a male rehabilitation ward, Hong Kong (China), 2011

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Clostridium difficile is an anaerobic, gram-positive bacterium, capable of sporulation when environmental conditions no longer support its growth. The sporulation capacity enables the organism to persist in the environment for extended periods of time.[1] *Clostridium difficile* is the main pathogen accountable for antibiotic-associated colitis and for 15% to 25% of cases of nosocomial antibiotic-associated diarrhoea.[2] Major risk factors such as increased severity of underlying illness, increased age, prior antimicrobial use and gastric acid suppressors have been identified for *Clostridium difficile*.[3]

In 2009, a predominant clone of *Clostridium difficile* polymerase chain reaction (PCR) ribotype 002 with hyper-sporulation was identified in Hong Kong (China). This was temporally associated with a significant increase in both the incidence of toxigenic *Clostridium difficile* from 0.53 to 0.95 per 1000 admissions ($P < 0.001$) and the rate of positive detection from 4.2% to 6.3% ($P < 0.001$) between the periods of 2004 to 2008 and 2009.[4]

Hospital outbreaks of *Clostridium difficile* are uncommon in Hong Kong (China). The first outbreak was recorded by the Centre for Health Protection in May 2006 affecting 10 patients. In June 2011, a second outbreak of *Clostridium difficile* infection in a male rehabilitation ward of a public hospital was reported. We conducted a case-control study to identify potential risk factors for this outbreak. Both case and control patients were included from the same ward during the same period of hospitalization to allow for a genuine search for risk factors in an epidemic setting.[5] We defined cases as patients hospitalized for at least 48 hours with PCR-positive *Clostridium difficile* during the period of 3 June to 18 July 2011. Controls were patients with comparable length of hospitalization in the same ward with negative PCR.

We performed person, place and time analysis and collected stool samples from all patients in the affected ward for real-time PCR for *Clostridium difficile*. Stool samples were cultured for *Clostridium difficile* if the PCR was positive, and ribotyping was performed for successfully cultured strains. We collected information from all cases and controls of potential risk factors such as age; activities of daily living; rehabilitation service; and past medical, drug and hospitalization histories by medical record review using a standardized questionnaire.

We identified 15 case patients in June 2011 (median age: 78 years; range: 51–98) and 17 control patients (median age: 81 years; range: 54–93). Ten out of 15 PCR-positive case patients were also culture positive. Eight were *Clostridium difficile* ribotype 002 and two were ribotype non-002. The 15 case patients were distributed in all five areas of the ward. We could not identify any statistically significant risk factors in the case control analysis. The outbreak stopped 21 days with no additional cases after the implementation of environmental disinfection and increasing infection control measures such as using disposable wipes and hand washing with liquid soap.

Owing to the small sample size of 32, this study could not identify individual patient risk factors related to disease transmission in the outbreak. Increasing infection control measures was associated with interruption

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in the disease transmission. The importance of strict compliance to infection control measures could not be overemphasized.

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